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**PATENT APPLICATION**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Shigemi OHTSU et al.

Group Art Unit: 1791

Application No.: 10/733,454

Examiner: M. VARGOT

Filed: December 12, 2003

Docket No.: 118039

For: PRODUCING METHOD OF POLYMER OPTICAL WAVEGUIDE

**RESPONSE TO NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In reply to the December 21, 2007 Notification of Non-Compliant Appeal Brief and February 8, 2008 Notification of Non-Compliant Appeal Brief (restarting the period for response) (Notification), please consider the following remarks.

**REMARKS**

**I. Saiki and Niino**

The Notification requests the submission of Japanese Patent Publication No. 2002-365429 to Saiki et al. (Saiki) and Japanese Patent Publication No. 2002-146066 to Niino et al. (Niino) and their English language translations, which the Patent Office has relied upon in the rejections appealed from. In the attached, Amended Brief on Appeal, these references and their English translations are provided in Appendix B.

The attached PTO-1449 Form makes Saiki and Niino, relied upon by the Patent Office to reject the claims, of record in this application. The Examiner is requested to return a copy of the PTO-1449 Form with Saiki and Niino initialed as considered to Applicants.

**II. Provisional Rejections Under The Doctrine Of Non-Statutory Obviousness-Type Double Patenting**

The Notification notes that the Brief on Appeal fails to identify or provide arguments concerning the provisional obviousness-type double patenting rejections contained in the Final Rejection.

The provisional obviousness-type double patenting rejections in the Final Rejection are:

- (1) the provisional rejection of claims 1-19 under the doctrine of obviousness-type double patenting over claims 9 and 10 of copending Application No. 11/005,077 to Shimizu et al. (Shimizu '077) in view of either Saiki or Niino;
- (2) the provisional rejection of claims 1-19 under the doctrine of obviousness-type double patenting over claims 1-17 of copending Application No. 10/936,639 to Shimizu et al. (Shimizu '639) in view of either Saiki or Niino;
- (3) the provisional rejection of claims 1-19 under the doctrine of obviousness-type double patenting over claims 1-20 of copending Application No. 10/930,816 to Ohtsu et al. (Ohtsu '816) in view of Saiki or Niino;
- (4) the provisional rejection of claims 1-19 under the doctrine of obviousness-type double patenting over claims 1-20 and 23-25 of copending Application No. 10/390,685 to Akutsu et al. (Akutsu '685) in view of either Saiki or Niino; and

(5) the provisional rejection of claims 1-19 under the doctrine of obviousness-type double patenting over claims 1-23 of copending Application No. 10/801,803 to Akutsu et al (Akutsu '803) in view of either Saiki or Niino.

Rejections (1), (3) and (4) have matured because the copending applications have issued as U.S. Patents Nos. 7,174,057, 7,317,861 and 7,294,292, respectively. The enclosed, Amended Brief on Appeal includes arguments addressing these rejections. The remaining provisional rejections have not matured (they are merely "provisional") because the claims are rejected over U.S. Patent Applications, not issued patents, and the claims of these applications may change.

Appellants note that a Brief on Appeal is not non-compliant for not addressing a ground of rejection, but that any ground of rejection not addressed in the Brief on Appeal will be summarily sustained by the Board of Patent Appeals (MPEP §1205.02). Nevertheless, as requested by the Notification, the enclosed Amended Brief on Appeal identifies the remaining non-matured provisional rejections and clarifies that Appellants elect to hold these rejections in abeyance and to delay response to these rejections until the rejections have matured.

**III. Conclusion**

For the foregoing reasons, the issues raised in the Notification have been cured.

Continuation of the appeal in due course is requested.

Respectfully submitted,



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JAO:JHB/mcp

Attachments:

Amended Brief on Appeal  
PTO-1449 Form

Date: March 10, 2008

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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Shigemi OHTSU et al.

Application No.: 10/733,454

Examiner: M. VARGOT

Filed: December 12, 2003

Docket No.: 118039

For: PRODUCING METHOD OF POLYMER OPTICAL WAVEGUIDE

AMENDED BRIEF ON APPEAL

Appeal from Group 1700

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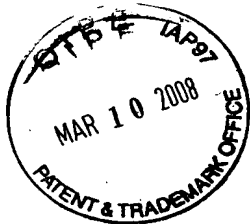


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**I. REAL PARTY IN INTEREST**

The real party in interest for this appeal and the present application is Fuji Xerox Co., Ltd., by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel 014569, Frames 0824-0825.

**II. RELATED APPEALS AND INTERFERENCES**

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellants, Appellants' representative, or the Assignee, that may be related to, or that will directly affect or be directly affected by or have a bearing upon, the Board's decision in the pending appeal.



**III. STATUS OF CLAIMS**

Claims 1-19 are on appeal.

Claims 1-19 are pending.

No claims are allowed or otherwise indicated to contain allowable subject matter.

Claims 1-19 are rejected.

Claims 1-19 are provisionally rejected.<sup>1</sup>

No claims are withdrawn from consideration.

No claims are canceled.

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<sup>1</sup> No appeal is taken from the provisional non-statutory obviousness-type double patenting rejections that have not matured.

**IV. STATUS OF AMENDMENTS**

No Amendment After Final Rejection has been filed.

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

The subject matter of independent claim 1 relates to a method for producing a polymer optical waveguide comprising seven steps:

(1) preparing a template 20 that is made of a template forming curable resin and has a concave portion corresponding to an optical waveguide core convex portion (Figs. 1B-1C; page 12, line 12 to page 17, line 20; and page 28, line 20 to page 29, line 9 of the specification as filed);

(2) applying an ozone treatment or irradiating light having a wavelength of 300 nm or less to at least one of a surface of the template having the concave portion and a core formation surface of a cladding film substrate (page 17, line 21 to page 20, line 21; page 19, line 12 to page 20, line 18);

(3) bringing the cladding film substrate into close contact with the template (page 20, line 22 to page 23, line 12);

(4) filling a core forming curable resin into the concave portion of the template with which the cladding film substrate is in close contact (page 23, line 3 to page 25, line 13);

(5) curing the filled core forming curable resin to form a core (page 25, lines 14-18);

(6) removing the template from the cladding film substrate (page 25, lines 19 to page 26, line 5); and

(7) forming a cladding layer on the cladding film substrate on which the core has been formed (page 26, line 6 to page 28, line 8).

The subject matter of independent claim 19 is directed to a method for producing a polymer optical waveguide and comprises the first five steps of claim 1. Claim 19 additionally recites that the template is light transmissive, and a difference between a refractive index of the template and that of the core is 0.01 or more (page 25, line 25 to page 26, line 5).

**VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

The following grounds of rejection are presented for review:

Claims 1-19 are rejected under 35 U.S.C. 103(a) over U.S. Patent No. 6,355,198 to Kim et al. (Kim) in view of either Japanese Patent Publication No. 2002-365429 to Saiki et al. (Saiki) or Japanese Patent Publication No. 2002-146066 to Niino et al. (Niino).

Claims 1-19 are rejected under the doctrine of obviousness-type double patenting over claims 1-18 of U.S. Patent No. 6,901,198 to Shimizu et al. (Shimizu '198) in view of either Saiki or Niino.

Claims 1-19 were provisionally rejected under the doctrine of obviousness-type double patenting over claims 9 and 10 of copending Application No. 11/005,077 to Shimizu et al. (Shimizu '077) in view of either Saiki or Niino. This rejection has matured because Shimizu '077 has issued as U.S. Patent No. 7,174,057 (Shimizu '057).

Claims 1-19 were provisionally rejected under the doctrine of obviousness-type double patenting over claims 1-20 of copending Application No. 10/930,816 to Ohtsu et al. (Ohtsu '816) in view of Saiki or Niino. This rejection has matured because Ohtsu '816 has issued as U.S. Patent No. 7,317,861 (Ohtsu '861).

Claims 1-19 were provisionally rejected under the doctrine of obviousness-type double patenting over claims 1-20 and 23-25 of copending Application No. 10/390,685 to Akutsu et al. (Akutsu '685) in view of either Saiki or Niino. This rejection has matured because Akutsu '685 has issued as U.S. Patent No. 7,294,292 (Akutsu '292).

The following grounds of rejection are not presented for review:

Claims 1-19 are provisionally rejected under the doctrine of obviousness-type double patenting over claims 1-17 of copending Application No. 10/936,639 to Shimizu et al. (Shimizu '639) in view of either Saiki or Niino.

Claims 1-19 are provisionally rejected under the doctrine of obviousness-type double patenting over claims 1-23 of copending Application No. 10/801,803 to Akutsu et al (Akutsu '803) in view of either Saiki or Niino.

**VII. ARGUMENT**

As described in Appellants' application, prior to Appellants' invention, optical waveguides could be fabricated by a variety of processes such as the five processes listed at page 1, line 11 to page 2, line 3 of the specification as filed. However, these processes have various drawbacks such as high cost, making them non-ideal (page 2, lines 4-16). Newer methods for waveguide production include the use of a nano-structure that can be filled through capillary action by a liquid polymer (page 4, lines 6-16). However, because capillary action is slow, this method takes a long time and thus is not suitable for mass production (page 4, lines 20-25). Additionally, volume of the resulting waveguide can change when a monomer solution is substituted for the liquid polymer solution (page 4, line 25 to page 5 line 3). Reduction of the viscosity of the liquid monomer to increase filling rate results in an increase in the volume change between the filled waveguide template and the resulting cured waveguide core when the monomer is polymerized (page 5, lines 13-18).

Appellants have found that by applying an ozone treatment or an irradiating light having a wavelength of 300 nm or less to at least one of the template surface, formed of a curable resin, and the surface of the core formation surface of the cladding film substrate, many advantages result. These advantages include (1) that the adhesiveness of the surface of the cladding film substrate and/or the template surface that were ozone treated or irradiated is increased (page 18, lines 8-13); (2) films that were previously unusable as a cladding film substrate due to poor adhesiveness can be used if treated by the claimed ozone treatment or light irradiation (page 18, lines 13-16); (3) the wettability of the core forming resin on the template surface or cladding film substrate surface that is ozone treated or irradiated by light is increased; and (4) a greatly increased capillary action filling rate of the curable resin in the template or mold (page 18, lines 22-23), allowing mass production to be used.

Appellants have performed empirical tests showing that the claimed method greatly outperforms the prior state of the art. In example 1, the template surface and core formation surface of the cladding film substrate were subjected to light irradiation by a Xenon excimer lamp having a central wavelength of 172 nm for 5 minutes in air. The speed achieved by the subsequent filling of the mold by UV curable resin under vacuum-induced capillary action was 0.8 cm/min (page 40, lines 14-22). In the comparative example 1 prepared in the same manner as example 1 but lacking the light irradiation of the template and cladding film substrate surfaces, the filling speed of the UV curable resin was only 0.2 cm/min (page 44, lines 5-7). Under the conditions of example 3, again using light irradiation by a Xenon excimer lamp for five minutes, a UV curable resin filling rate of 1.5 cm/min was measured (page 42, lines 4-20). In comparative example 2, corresponding to example 3 but lacking the light irradiation of the template and cladding film substrate surfaces, the filling speed of the UV curable resin was only 0.2 cm/min (page 44, lines 10-13). Similarly, example 6 and comparative example 3 resulted in UV curable resin fill rates of 0.8 cm/min (page 43, line 24 to page 44, line 3) and 0.3 cm/min (page 44, lines 15-20), respectively. However, in the comparative example 3, the resulting core did not adhere to the cladding film substrate once the template was removed (id.).

The November 14, 2006 and April 30, 2007 Office Actions allege that the claimed subject matter is unpatentable over Kim in view of either Niino or Saiki and over Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 claims 1-18 in view of either Saiki or Niino.

As requested by the Appellee in the Notification of Non-Compliant Appeal Brief, English Abstracts and machine translations of Saiki and Niino are attached in Appendix B.

As discussed in the background of Appellants' specification, while Niino discloses use of short wavelength UV light to improve the hydrophilicity of the surface of fluorine-based polymer mold goods and Saiki discloses the use of UV light to improve the hydrophilicity of

the surface of a protective film so that the film better adheres to a polarizer, neither Niino nor Saiki discloses or suggests the modification of Kim or Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 claims 1-18 to irradiate the surface of a cladding film substrate or template in order to improve the filling rate of a UV curable resin.

**A. Claim 1 Is Patentable Over Kim In View Of Either Niino Or Saiki**

**1. Kim Fails To Disclose Applying An Ozone Treatment Or Irradiating Light Having A Wavelength Of 300 nm Or Less**

Regarding independent claim 1, Kim fails to disclose the step of "(2) applying an ozone treatment or irradiating light having a wavelength of 300 nm or less to at least one of a surface of the template having the concave portion and a core formation surface of a cladding film substrate.

Kim discloses a method of forming waveguides by micromolding. In the embodiment cited by the Office Action, article 20 (also called applicator 20) has indentations 24 which have rectangular cross-sections (Fig. 15). A fluid precursor 36 is first applied to applicator 20 to fill indentations 24 and the excess is scraped off (Fig. 15; col. 33, lines 2-5). Applicator 20, filled with the fluid precursor 36, then is placed on substrate 30 forming channels 32 (col. 33, lines 12-15). The applicator 20 can then be removed to leave the fluid precursor 36 behind on the substrate 30, after which it can be made dimensionally stable (col. 33, lines 15-17). Alternatively, the fluid precursor 36 can be made hard prior to removal of applicator 20 (col. 33, lines 17-20).

The Office Action admits that Kim fails to disclose step (2), but alleges that Saiki and Niino each cure this deficiency.

**2. Niino Is Not Combinable With Kim**

Niino discloses a method of modifying the surface of fluorine-based polymer mold goods by irradiation using a vacuum-ultraviolet laser having a wavelength of 157 nm under the presence of water or steam (paragraph [0006]). Niino discloses that the wavelength of



157 nm is specifically chosen to as to disassemble water molecules to generate sufficient active species to surface treat fluororesin (paragraph [0008]). The easy generation of the active species results because water and steam are highly absorbing of energy at 157 nm (paragraph [0008]) and break into reaction intermediaries such as a hydrogen atom and a hydroxyl-group radical (paragraph [0007]). The resulting hydrogen atoms and hydroxyl-group radicals interact with the mold goods surface molecules to produce surface hydrophilization (paragraph [0007]).

One of ordinary skill in the art would not have been motivated to modify the disclosure of Kim by adding the irradiation step of Niino because: (1) the disclosures of Kim and Niino are not technically compatible; and (2) neither Kim nor Niino discloses that the disclosure of Kim has a problem with hydrophilicity. Further, (3) adding the irradiation step of Niino to the disclosure of Kim would render the disclosure of Niino unsuitable for its intended purpose; and (4) the modification of the disclosure of Kim with that of Niino is improper because it uses impermissible hindsight.

The disclosures of Kim and Niino are incompatible because Kim fails to disclose that substrate 30 is fluorine-based. In fact, Kim teaches away from such a material, stating that suitable materials for substrate 30 include gold, glass, and silicon (col. 35, lines 31-34). One of ordinary skill in the art would not have been motivated to add the irradiation step of Niino to the disclosure of Kim because it does not make technical sense. The purpose of Niino's use of a 157 nm excitation wavelength is because both the fluororesin of Niino's mold goods and the water and steam surrounding the mold goods absorb at this wavelength to produce the necessary reaction components that enable the surface hydrophilization to occur. Because the disclosure of Kim indicates that substrate 30 is not a fluororesin and that water and steam are not present during the article/waveguide forming process, there is no technical reason to add the irradiation step of Niino to the disclosure of Kim as proposed by the Office Action.

One of ordinary skill in the art also would not have been motivated to add the irradiation step of Niino to the disclosure of Kim because Kim does not have a problem that the addition of the irradiation step of Niino would address. Neither Kim nor Niino discloses that the article/waveguide forming process of Kim suffers from a problem of having too little hydrophilicity regarding the adhesion of fluid precursor 36 to substrate 30. While the November 14, 2006 Office Action cites to Kim at col. 21, line 13 as indicating "that a hydrophilic surface would be encompassed within the invention," Kim also, within the same citation, indicates that other types of materials, including hydrophobic materials, are suitable. Indeed, Kim recognizes hydrophilic problems in other areas, such as regarding the attachment of a cladding layer 170 to waveguides 38 once the waveguides 38 have been formed (see paragraph beginning at col. 34, line 33). Thus, the absence of any disclosure by Kim of a hydrophilic problem regarding the adhesion of fluid precursor 36 to substrate 30 implies that such a problem does not exist. Because the disclosure of Kim implicitly indicates that there is no problem with hydrophilicity of substrate 30, there is no technical reason to add the irradiation step of Niino to the disclosure of Kim as proposed by the Office Action.

The proposed combination of Kim and Niino is improper because adding the irradiation step of Niino to the disclosure of Kim would render the disclosure of Niino unsuitable for its intended purpose. As discussed above, Kim fails to disclose that substrate 30 can be made of a fluoro resin or that the article/waveguide forming process utilizes water or steam. Without even one of the fluoro resin or water and steam components, the irradiation step of Niino cannot induce the intended hydrophilization of a fluoro resin surface. Thus, adding the irradiation step of Niino to the article/waveguide forming process of Kim necessarily renders the disclosure of Niino unsuitable for its intended purpose in violation of MPEP §2143.01(V) and is thus improper.

Further, the modification of the disclosure of Kim with that of Niino is improper because it uses impermissible hindsight. The Office Action states that it would have been obvious to combine the disclosure of Niino with that of Kim to improve the hydrophilicity of a polymeric surface "as noted by Applicant" (November 14, 2006 Office Action, page 2). Thus, the Patent Office has impermissibly relied on Appellants' disclosure to provide the motivation to combine.

Additionally, Niino is directed to a method of increasing hydrophilicity of a surface under a process that requires water or steam, whereas the claimed subject matter is a process which benefits from the presence of ozone or air from which ozone is produced. Thus, even if the disclosure of Niino is combined with that of Kim, the resultant combination would not correspond to the claimed subject matter.

For the forgoing reasons, the Patent Office's proposed combination of the disclosures of Kim and Niino is improper.

### **3. Saiki Is Not Combinable With Kim**

Saiki discloses production of a transparent protection film 3 for a polarizer 1 for use in a liquid crystal display (paragraph [0002]). The transparent protection film 3 can be a cellulose type polymer, but preferably is triacetyl cellulose (TAC) (paragraph [0019]). The hydrophilic nature of a processing surface "a" of the transparent protection film 3 is increased by ultraviolet irradiation (drawing 2; paragraphs [0014] and [0022]). After exposure of transparent protection film 3, a glue line 2 of a polyvinyl alcohol system adhesive is applied and the transparent protection film 3 is joined to the polarizer 1 (paragraph [0062]).

One of ordinary skill in the art would not have been motivated to combine the UV irradiation step of Saiki with the disclosure of Kim because (1) neither Kim nor Saiki discloses or suggests that Kim has a problem with hydrophilicity that would be benefited by the modification of the method of Kim by that of Saiki; and (2) there is no motivation to

combine the disclosures of Kim and Saiki. Further, (3) the modification of the disclosure of Kim with that of Saiki is improper because it uses impermissible hindsight.

Neither Kim nor Saiki discloses that Kim has a problem with hydrophilicity regarding the adhesion of fluid precursor 36 to substrate 30. Thus, one of ordinary skill in the art would understand, from the applied references taken as a whole, that no benefit would be derived from increasing the hydrophilicity of the surface of either applicator 20 or substrate 30.

Further, Saiki is directed to increasing the hydrophilic nature of the surface of a transparent protective film 3, preferably made of triacyetyl cellulose, in order to apply a glue line 2 (adhesive) in order to join the transparent protective film 3 with a polarizer 1 to produce a polarizer plate. In contrast, Kim is directed to forming structures 38 by filling an applicator 20 with a fluid precursor 36 which is then applied to a substrate 30. Thus, Kim and Saiki address divergent technologies and lack any motivation or suggestion to combine them as asserted by the Office Action.

Further, the modification of the disclosure of Kim with that of Saiki is improper because it uses impermissible hindsight. The Office Action states that it would have been obvious to combine the disclosure of Saiki with that of Kim to improve the hydrophilicity of a polymeric surface "as noted by Applicant" (November 14, 2006 Office Action, page 2). Thus, the Patent Office has impermissibly relied on Appellants' disclosure to provide the motivation to combine.

For the forgoing reasons, the Patent Office's proposed combination of the disclosures of Kim and Saiki is improper.

**B. Claim 19 Is Patentable Over Kim In View Of Either Niino Or Saiki**

Regarding independent claim 19, Kim fails to disclose (i) the step of "(2) applying an ozone treatment or irradiating light having a wavelength of 300 nm or less to at least one of a surface of the template having the concave portion and a core formation surface of a cladding

film substrate; and (ii) "wherein the template is light transmissive, and a difference between a refractive index of the template and that of the core is 0.01 or more."

Regarding feature (i) above, claim 19 step (2) is identical to claim 1 step (2). Thus, claim 19 is patentable over the applied references for the same reasons as stated in relation to the rejection of claim 1.

Kim fails to disclose feature (ii) above wherein the template is light transmissive and a difference between a refractive index of the template and that of the core is 0.01 or more. While Kim discloses that a template can be "transparent to radiation," Kim discloses this in relation to curing the fluid precursor 36 (col. 11, lines 42-44). Kim is silent as to any relationship between the refractive indices of the applicator 20 and the resulting structure 38. Further, Kim has no reason to discuss the relative refractive indices of the applicator 20 and the resulting structure 38 because Kim does not disclose or suggest the retainment of the applicator 20 as a cladding layer. Further, even if the proposed combination of Kim and Niino is deemed proper, Niino fails to cure the deficiency of Kim.

In contrast, as disclosed in embodiments, Appellants' template can be retained as a cladding layer (page 25, line 25 to page 26, line 5). The difference in refractive indices between the template and the core thus improves performance of the core as an optical waveguide.

**C. Independent Claims 1 And 19 Are Patentable Over Shimizu '198 Claims 1-18, Shimizu '057 Claims 1-2, Ohtsu '861 Claims 1-20, And Akutsu '292 Claims 1-23 In View Of Either Saiki Or Niino**

Shimizu '077 has issued as Shimizu '057. Claims 9-10 of Shimizu '077 correspond to claims 1-2 of Shimizu '057.

Ohtsu '816 has issued as Ohtsu '861. Claims 1-20 of Ohtsu '816 correspond to claims 1-20 of Ohtsu '861.

Akutsu '685 has issued as Akutsu '292. Claims 1-20 and 23-25 of Akutsu '685 correspond to claims 1-23 of Akutsu '292.

1. **Niino Is Not Combinable With Any Of Shimizu '198, Shimizu '057, Ohtsu '861, And Akutsu '292**

Claims 1-18 of Shimizu '198, claims 1-2 of Shimizu '057, claims 1-20 of Ohtsu '861, and claims 1-23 of Akutsu '292 claim a process for producing an optical waveguide having the steps of preparing a mold having concave portions; bringing a cladding substrate into contact with the mold; and filling the concave portions with a curable resin (claim 1). The Office Action refers to the November 14, 2006 Office Action which acknowledges that Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 fail to claim (or disclose) a step of applying an ozone treatment or irradiating light having a wavelength of 300 nm or less to at least one of a surface of a template or a cladding film portion as recited in Appellants' claims 1-19.

Regarding independent claims 1 and 19, one of ordinary skill in the art would not have been motivated to modify the claims or disclosure of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 by adding the irradiation step of Niino because: (1) the disclosures of each of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 are not technically compatible with Niino; (2) none of Shimizu '198, Shimizu '057, Ohtsu '861, Akutsu '292 and Niino discloses that Shimizu '198, Shimizu '057, Ohtsu '861, or Akutsu '292 has a problem with hydrophilicity; and (3) there is no motivation to combine when any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 is taken as a whole with Niino. Further, (4) adding the irradiation step of Niino to any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 would render the disclosure of Niino unsuitable for its intended purpose; and (5) the modification of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 with that of Niino is improper because it uses impermissible hindsight.

One of ordinary skill in the art would not have been motivated to add the irradiation step of Niino to any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 because it does not make technical sense. The purpose of Niino's use of a 157 nm excitation wavelength is because both the fluororesin of Niino's mold goods and the water and steam surrounding the mold goods absorb at this wavelength to produce the necessary reaction components that enables the surface hydrophilization to occur. Because Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 each indicate that water and steam are not present during the core forming process, there is no technical reason to add the irradiation step of Niino to any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 as proposed by the Office Action.

One of ordinary skill in the art would further not have been motivated to add the irradiation step of Niino to any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 because Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 do not have a problem that the addition of the irradiation step of Niino would address. None of Shimizu '198, Shimizu '057, Ohtsu '861, Akutsu '292, and Niino discloses that the waveguide forming process of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 suffers from a problem of having too little hydrophilicity regarding the adhesion of the curable resin to the cladding substrate. Because Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 each indicates that there is no problem with a lack of surface hydrophilicity, there is no technical reason to add the irradiation step of Niino to any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 as proposed by the Office Action.

The alleged combination of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 with Niino is further improper because adding the irradiation step of Niino to any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 would render the disclosure of Niino unsuitable for its intended purpose. As discussed above, Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 each fails to disclose that the waveguide forming process utilizes

water or steam. Without even one of the fluororesin or water and steam components, the irradiation step of Niino cannot induce the intended hydrophilization of a fluororesin surface. Thus, adding the irradiation step of Niino to the waveguide forming process of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 necessarily renders the disclosure of Niino unsuitable for its intended purpose in violation of MPEP §2143.01(V) and is thus improper.

Further, the modification of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 with that of Niino is improper because it uses impermissible hindsight. The November 14, 2006 Office Action states that it would have been obvious to combine the disclosure of Niino with each of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 in order to "render the surface more hydrophilic" (November 14, 2006 Office Action, pages 4-6). Given that there is no disclosure or suggestion that the cladding substrate or mold of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 has insufficient hydrophilicity, the Patent Office has impermissibly relied on Appellants' disclosure to provide the motivation to combine.

For the forgoing reasons, the Patent Office's proposed combinations of each of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 with Niino are improper.

**2. Saiki Is Not Combinable With Any Of Shimizu '198, Shimizu '057, Ohtsu '861, And Akutsu '292**

Regarding independent claims 1 and 19, one of ordinary skill in the art would not have been motivated to combine the UV irradiation step of Saiki with any of claims 1-18 of Shimizu '198, claims 1-2 of Shimizu '057, claims 1-20 of Ohtsu '861, and 1-23 of Akutsu '292 because (1) none of Shimizu '198, Shimizu '057, Ohtsu '861, Akutsu '292 and Saiki disclose or suggest that any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 has a problem with hydrophilicity that would be addressed by the modification of the method of Shimizu



'198, Shimizu '057, Ohtsu '861, or Akutsu '292 by that of Saiki; and (2) there is no motivation to combine any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 and Saiki.

Further, (3) the modification of each of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 with Saiki is improper because it uses impermissible hindsight.

None of Shimizu '198, Shimizu '057, Ohtsu '861, Akutsu '292 and Saiki discloses that any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 has a problem with hydrophilicity regarding the adhesion of the curable resin to the cladding substrate. Thus, one of ordinary skill in the art would understand, from each of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 taken with Saiki as a whole, that no benefit would be derived from increasing the hydrophilicity of the surface of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292's mold or cladding substrate.

Further, Saiki is directed to increasing the hydrophilic nature of the surface of a transparent protective film 3, preferably made of triacyetyl cellulose, in order to apply a glue line 2 (adhesive) in order to join the transparent protective film 3 with a polarizer 1 to produce a polarizer plate.

In contrast, Shimizu '198 is directed to forming structures 38 by filling an applicator 20 with a fluid precursor 36 which is then applied to a substrate 30 (Figs. 5A-5G). Shimizu '057 is directed to forming optical waveguide core 320 on lower clad film 300 by filling mold 200 with a curable resin (Figs. 4A-4G). Ohtsu '861 is directed to forming core 32 on lower clad layer 31 by filling mold 20 with curable resin (Figs. 1A-1F). Akutsu '292 is directed to forming core 40 on cladding substrate 30 by filling mold 20 with curable resin (Figs. 1A-1F).

Thus, Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 all address divergent technologies from Saiki and Shimizu '198, Shimizu '057, Ohtsu '861, Akutsu '292, and Saiki all lack any motivation or suggestion to combine the references as proposed by the Office Action.

Further, the modification of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 with that of Saiki is improper because it uses impermissible hindsight. The Office Action cites to the November 14, 2006 Office Action which states that it would have been obvious to combine Saiki with each of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 to "render the surface more hydrophilic" (November 14, 2006 Office Action, pages 4-6). Given that there is no disclosure or suggestion that the cladding substrate or mold of any of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 has insufficient hydrophilicity, the Patent Office has impermissibly relied on Appellants' disclosure to provide the motivation to combine.

For the forgoing reasons, the Patent Office's proposed combinations of Shimizu '198, Shimizu '057, Ohtsu '861, and Akutsu '292 with Saiki are improper.

**D. Non-Matured Provisional Rejections Of Claims 1-19 Under The Doctrine Of Obviousness-Type Double Patenting**

As indicated in the February 13, 2007 Request for Reconsideration, the remaining provisional rejections (over Shimizu '639 and Akutsu '803) have not matured because the applications over which the claims are rejected have not issued as patents. Appellants will consider and respond to the rejections when the applications issue as patents and, thus, the rejections mature.

**VIII. CONCLUSION**

For all of the reasons discussed above, it is respectfully submitted that the rejections are in error and that claims 1-19 are in condition for allowance. For all of the above reasons, Appellants respectfully request this Honorable Board to reverse the rejections of claims 1-19.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'James A. Oliff', written in a cursive style.

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**APPENDIX A - CLAIMS APPENDIX**

CLAIMS INVOLVED IN THE APPEAL:

1. A method for producing a polymer optical waveguide comprising the steps of:
  - (1) preparing a template that is made of a template forming curable resin and has a concave portion corresponding to an optical waveguide core convex portion;
  - (2) applying an ozone treatment or irradiating light having a wavelength of 300 nm or less to at least one of a surface of the template having the concave portion and a core formation surface of a cladding film substrate;
  - (3) bringing the cladding film substrate into close contact with the template;
  - (4) filling a core forming curable resin into the concave portion of the template with which the cladding film substrate is in close contact;
  - (5) curing the filled core forming curable resin to form a core;
  - (6) removing the template from the cladding film substrate; and
  - (7) forming a cladding layer on the cladding film substrate on which the core has been formed.
2. The method of claim 1, wherein the light having a wavelength of 300 nm or less is irradiated by an excimer radiation source.
3. The method of claim 2, wherein the excimer radiation source is a dielectric barrier discharge excimer radiation source having a central emission wavelength of 172 nm.
4. The method of claim 1, wherein the template forming curable resin is liquid silicone rubber.
5. The method of claim 4, wherein the liquid silicone rubber is liquid dimethyl siloxane rubber.
6. The method of claim 1, wherein the core forming curable resin is an acrylic UV curable resin.

7. The method of claim 1, wherein the core forming curable resin is an epoxy UV curable resin.
8. The method of claim 1, wherein a refractive index of the cladding film substrate is 1.55 or less.
9. The method of claim 1, wherein the cladding film substrate is an alicyclic acrylic resin film.
10. The method of claim 1, wherein the cladding film substrate is an alicyclic olefinic resin film.
11. The method of claim 10, wherein the alicyclic olefinic resin film is a resin film having a norbornene structure on a main chain and a polar group on a side chain.
12. The method of claim 1, wherein a surface energy of the template is in a range of 10 to 30 dyn/cm.
13. The method of claim 1, wherein a Shore rubber hardness of the template is in a range of 15 to 80.
14. The method of claim 1, wherein a surface roughness of the template is 0.2  $\mu\text{m}$  or less.
15. The method of claim 1, wherein the template is light transmissive in at least one of a UV region and a visible region.
16. The method of claim 1, wherein a volume change when the core forming curable resin is cured is 10% or less.
17. The method of claim 1, wherein difference between a refractive index of the cladding film substrate and that of the cladding layer is 0.05 or less.
18. The method of claim 1, wherein a refractive index of the core is 1.50 or greater.
19. A method for producing a polymer optical waveguide comprising the steps of:

(1) preparing a template that is made of a template forming curable resin and has a concave portion corresponding to an optical waveguide core convex portion;

(2) applying an ozone treatment or irradiating light having a wavelength of 300 nm or less to at least one of a surface of the template having the concave portion and a core formation surface of a cladding film substrate;

(3) bringing the cladding film substrate into close contact with the template;

(4) filling a core forming curable resin into the concave portion of the template with which the cladding film substrate is in close contact; and

(5) curing the filled core forming curable resin to form a core,

wherein the template is light transmissive, and a difference between a refractive index of the template and that of the core is 0.01 or more.



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**APPENDIX B - EVIDENCE APPENDIX**

1) Japanese Patent Publication No. JP-A-2002-365429 with English Abstract and machine translation.

2) Japanese Patent Publication No. JP-A- A-2002-146066 with English Abstract and machine translation.



Application No. 10/733,454

**APPENDIX C - RELATED PROCEEDINGS APPENDIX**

NONE